

Control of Single Axis Magnetic Levitation System Using Fuzzy Logic Control

Authors : A. M. Benomair, M. O. Tokhi

Abstract : This paper presents the investigation on a system model for the stabilization of a Magnetic Levitation System (Maglev's). The magnetic levitation system is a challenging nonlinear mechatronic system in which an electromagnetic force is required to suspend an object (metal sphere) in air space. The electromagnetic force is very sensitive to the noise which can create acceleration forces on the metal sphere, causing the sphere to move into the unbalanced region. Maglev's give the contribution in industry and this system has reduce the power consumption, has increase the power efficiency and reduce the cost maintenance. The common applications for Maglev's Power Generation (e.g. wind turbine), Maglev's trains and Medical Device (e.g. Magnetically suspended Artificial Heart Pump). This paper presents the comparison between dynamic response and robust characteristic for both conventional PD and Fuzzy PD controller. The main contribution of this paper is the proof of fuzzy PD type stabilization and robustness. By use of a method to tune the scaling factors of the linear PD type fuzzy controller from an equivalent tuned conventional PD.

Keywords : magnetic levitation system, PD controller, Fuzzy Logic Control, Fuzzy PD

Conference Title : ICSR2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020